5.03 ASPHALT MATERIALS

5.03.01 GENERAL

These instructions cover the inspection and sampling of asphalt materials.

(a) Performance Graded Asphalt Binders and Cutback Asphalt.

Asphalt is a natural constituent of most crude petroleum oils. The crude petroleum is refined to separate the various components including naphtha, gasoline, kerosene, diesel fuel, lubricating oils, etc., and to recover the asphalt.

Asphalt binder is the basic result of this recovery and it is produced in a variety of grades. For highway uses, these are Performance Graded (PG) Binders ranging from PG52-22 to PG82-22. At normal temperatures asphalt binder is semi-solid and is brought to and maintained in a liquid state by the application of heat.

Rapid curing (RC) and medium curing (MC) cutback asphalts consist of an asphalt base fluxed with suitable petroleum distillates or diluents. Blending of the asphalt binder and diluent is done either in tanks or by automatic blending devices which draw the individual ingredients from storage tanks, mix them in pre-determined proportions and discharge the mixture into railroad tank cars or trucks.

(b) Emulsified Asphalt.

Emulsified asphalt is a homogeneous liquid mixture consisting of asphalt binder, water and a small amount of emulsifying chemicals. Some emulsified asphalt grades also contain added petroleum distillate to improve mixing conditions and give long term stockpile life. Asphalt emulsions are of the anionic or cationic types. In general the anionic type deposits the asphalt binder by evaporation of the water while in the case of the cationic type the asphalt binder is deposited because of an electro-chemical attraction to the aggregate.

(c) Asphalt Rejuvenating Agent.

Asphalt Rejuvenating Agent (ARA) is composed of a polymer modified asphalt emulsion. It is used to increase the ductility and penetration of the asphalt binder in an existing pavement.

5.03.02 BASIS OF ACCEPTANCE

Performance Graded Asphalt Binders, Cutback Asphalt, and Emulsified Asphalt products from prequalified producers are accepted on the basis of a certification prepared by the producer which states that the material meets specification requirements. A producer's certification must accompany each load and it must be obtained by the Engineer at destination and filed as documentary evidence that the material is acceptable.

For producers who are not prequalified, asphalt materials will be accepted based on the results of tests conducted by the Materials and Research Center (KDOT's Materials Central Laboratory) on samples from each shipping container. Testing must be completed prior to incorporation into the project.

Special storage facilities (terminals) may be established on approval of the Chief, Bureau of Materials and Research at a location other than a refinery. A producer's certification must accompany each shipment.

Verification samples are taken from shipping containers at destination on a basis established by the Chief, Bureau of Materials and Research as shown in the Sampling Frequency Schedule in **5.03.04**. Tests on these samples will be performed at the Materials and Research Center. All testing will be in accordance with the schedule in **5.03.05**.

5.03.03 SAMPLING PROCEDURE

Asphalt materials must be sampled in accordance with Department of Transportation Test Methods as set forth in subsection **5.16.26**.

5.03.04 ASPHALT SAMPLING FREQUENCY

The following Sampling Frequency can be used for Performance Graded Asphalt Binders, Cutback Asphalt, and Emulsified Asphalt.

SAMPLING FREQUENCY LEVEL I - one out of every three trucks is sampled and tested. When 5 consecutive samples from all sources statewide have been tested, by the Central Laboratory, and all comply with specification requirements, the producer will be upgraded to Level II.

SAMPLING FREQUENCY LEVEL II - one out of every six trucks is sampled and tested. When 5 consecutive samples from all sources statewide have been tested, by the Central Laboratory, and all comply with specification requirements, the producer will be upgraded to Level III.

SAMPLING FREQUENCY LEVEL III - one out of every 12 trucks is sampled and tested.

The sampling frequency levels are entered into CMS. All newly prequalified asphalts begin at Level I. Sampling frequency levels can carry over from year to year. Changes to sampling frequencies for a producer are entered in CMS as soon as they change, and will show up as an update on the next DTMTP030 report, which is printed weekly at the headquarters and the districts. To check or verify the frequency in CMS, enter the producer materials screen (DTMTB010), (hot key M, B, B) with the producer code. In addition, District Materials Engineers and Lab Chiefs will be notified of changes by e-mail as soon as the change is made. Indicate the sampling frequency level used on the sample container or information sheet.

Some samples may be disposed of in the Materials and Research Center Lab queue as soon as the sampling frequency changes. The disposal will not be entirely random, as all projects will be represented, but will be random within projects. The sample ID will be cleared with the explanation, “Not tested due to change in sample frequency requirements.” Samples over 14 days old when received will be disposed.

5.03.05 TESTING PERFORMED FOR EACH SAMPLING FREQUENCY LEVEL

PERFORMANCE GRADED ASPHALT BINDERS

SAMPLING FREQUENCY LEVEL I - of the 5 samples, all will get a complete analysis.

SAMPLING FREQUENCY LEVEL II - of the 5 samples, all will get a complete analysis.

SAMPLING FREQUENCY LEVEL III - once this level is reached all samples will get a partial analysis. Each month, a complete analysis will be performed on at least one sample per grade per producer.

CUTBACK ASPHALT, EMULSIFIED ASPHALT, and ASPHALT REJUVENATING AGENT

All samples, regardless of frequency level, will get a complete analysis.

TESTS FOR EACH TYPE OF ASPHALT

CUTBACK ASPHALT

Kinematic Viscosity, 140°F
Distillation test:
- Distillates
- Residue

Tests on distillation residue:
- Vacuum viscosity, 140°F **OR** Penetration, 77°F
- Ductility, 77°F **OR** 60°F

EMULSIFIED ASPHALT

Saybolt Furol Viscosity, 77°F **OR** 122°F
Residue by Distillation
Oil Distillate – **WHEN REQUIRED**
Storage Stability, one day – **WHEN REQUIRED**
Sieve Test – **WHEN REQUIRED**
Demulsibility - **WHEN REQUIRED**

Particle Charge - **WHEN REQUIRED**
Tests on Distillation Residue:
- Penetration, 77°F
- Ductility, 77°F
- Float Test, 140°F **HFMS-1 ONLY**
- Saybolt Furol Viscosity, 180°F **CMS-1 ONLY**
- Solubility – **WHEN REQUIRED**
- Elastic Recovery – **ST-1P ONLY**

ASPHALT REJUVENATING AGENT

Viscosity, Saybolt-Furol, 77°F
Residue by Evaporation
Sieve Test

Tests on Residue:
- Penetration, 39°F, 50g, 5 sec.
- Asphaltenes
- Rotational Viscosity, 275°F

PERFORMANCE GRADED (PG) ASPHALT BINDER

COMPLETE ANALYSIS

Original Binder:
- Flash Point, COC
- Brookfield Viscosity, 135°C
- Dynamic Shear
- Separation Test, 163°C (modified only)

Rolling Thin Film Oven Residue:
- Mass Loss
- Dynamic Shear
- Elastic Recovery, 77°F (modified only)

Pressure Aging Vessel Residue:
- Dynamic Shear
- Creep Stiffness, 60 seconds
- Slope

PARTIAL ANALYSIS

Original Binder:
- Dynamic Shear

Rolling Thin Film Oven Residue:
- Dynamic Shear